

III. Genus HISTIODERMA, Kinahan.

7. *Histioderma hibernicum*, Kinahan.

IV. Genus PLANOLITES, Nicholson.

8. *Planolites vulgaris*, Nicholson.

9. — *granosus*, Nicholson.

10. — *articulatus*, Nicholson.

B. TRAILS.

V. Genus CROSSOPODIA, M'Coy.

11. *Crossopodia scotica*, M'Coy.

12. — *lata*, M'Coy.

VI. Genus NEMERTITES, M'Leay.

13. *Nemertites Ollivantii*, Murchison.

14. — (Palæochorda) *major*, M'Coy.

15. — (Palæochorda) *minor*, M'Coy.

VII. Genus MYRIANITES, M'Leay.

16. *Myrianites tenuis*, M'Coy.

17. — *Murchisoni*, Emmons.

C. APPENDIX.

VIII. Genus CARIDOLITES, Nicholson.

18. *Caridolites Wilsoni*, Nicholson.

May 15, 1873.

WILLIAM SPOTTISWOODE, M.A., Treasurer and Vice-President, in the Chair.

Major Thomas George Montgomerie, R.E., was admitted into the Society.

The following communications were read:—

- I. "Determination of the Number of Electrostatic Units in the Electromagnetic Unit made in the Physical Laboratory of Glasgow University." By DUGALD M'KICHAN, M.A. Communicated by Sir WILLIAM THOMSON, F.R.S. &c. Received April 15, 1873.

(Abstract.)

The object of this paper is to describe experiments made at intervals from 1870 to 1872 in the Physical Laboratory of Glasgow University to determine the relation between the fundamental units in the two systems of absolute electrical measurement, the electromagnetic and the electrostatic. A summary is also given of the results of similar observations made by W. F. King in 1867 and 1868.

The two systems of electrical measurement, or the units which they employ, are founded on the fundamental units of time, mass, and space applied to the observed effects of electricity at rest and electricity in motion. The dimensions of quantity in the two systems are such that the ratio of the electromagnetic and the electrostatic unit of quantity is expressible as a velocity.

This velocity, usually known as v , is not only of great importance in all combinations of electromagnetic and electrostatic action, but it is also of great scientific importance in the theory of the propagation of electromagnetic disturbances through a dielectric medium. It occupies a very important place in the development of the electromagnetic theory of light by Professor Clerk Maxwell, according to whose theory this velocity v is the same as the velocity of light.

The first experimental determination of v was made by Weber from a common electrostatic and electromagnetic measure of capacity. As the result of Weber's experiments, v was found to be $310\cdot74 \times 10^8$ centims. per second.

Another determination was made by Prof. Clerk Maxwell in 1868, by means of a direct comparison of electrostatic attraction with electromagnetic repulsion. His experiments gave $v = 288 \times 10^8$ centims. per second.

The value of v given by the experiments here described is 293×10^8 centims. per second. The method employed was that of obtaining an absolute electrostatic and an absolute electromagnetic measurement of the same electromotive force. v is defined as the ratio of the units of quantity in the two systems; but it follows from the definition of electromotive force, that v is also the ratio of the units of electromotive force in the two systems.

The electromotive force, or the difference of potentials between the two poles of a constant Daniell's battery, was measured electrostatically by means of Sir William Thomson's absolute electrometer. The absolute electromagnetic value of this electromotive force was given by the effect of the current which it maintained in the circuit of an electro-dynamometer. The determination of this value depended on the resistance of the electro-dynamometer-circuit, which was reckoned in terms of the absolute value of the British-Association standard unit of resistance. Any correction which may hereafter be found to be applicable to the absolute value of this standard coil, as measured at King's College by Professors Clerk Maxwell, Balfour Stewart, and Fleming Jenkin, must be applied to the value of v given above.

The comparisons made in 1867 and 1868 by Mr. King gave as the mean value of v , $284\cdot6 \times 10^8$ centims. per second.

The experiments made in 1870 with the new absolute electrometer gave as the mean result $v = 294\cdot5 \times 10^8$ centims. per second. The result

of later observations made under much more favourable circumstances was $v=292.4 \times 10^8$ centims. per second.

The latest observations (1872) furnish the most probable value of v , 293×10^8 centims. per second.

II. "On *Jeypoorite*, a Sulph-antimonial Arsenide of Cobalt." By Major W. A. Ross, late Royal Artillery. Communicated by Prof. W. H. MILLER, Foreign Sec. R.S. Received April 16, 1873.

A mystery has pervaded the history and character of this almost unknown mineral (the very name of which is mis-spelled "*Syepoorite*"), which was scarcely to have been expected from English mineralogists, as the only place in the world in which it has yet been found is the copper-mines of *Khetree*, in the Hindu principality of Jeypoor, in Rajpootana, India, the Rajah of which territory politely sent the writer the specimens of which an analysis is here submitted.

Notwithstanding Jeypoor is one of the feudatories of the British Government of India, it is believed that there is not a specimen of this mineral in the British Museum; at any rate there was not one in 1868, when Professor Maskelyne even expressed to the writer his doubt of the existence of such a mineral.

Professor Nicol ('Manual of Mineralogy,' p. 458) tells us (1849) that this mineral, which he calls "*Syepoorite*," from "*Syepoor near Rajpootana*!" was analyzed by Middleton, who found in it 64.64 per cent. cobalt and 35.36 sulphur*. Dana and other mineralogists have followed this account; and Professor Miller informs me that Middleton's analysis is given in the 'Memoirs of the Chemical Society,' vol. iii. 1845-48, p. 39. There *may*, of course, be a mineral from the same place answering the description of Middleton's analysis. All I assert is that none of the many crystals examined by me gave the indications of a pure sulphide of cobalt. At first I certainly thought *Jeypoorite* was only an antimonial sulphide of cobalt, not having any reason to doubt further the description given by Nicol; but by a closer and novel method of examination, to be presently described, I succeeded in detecting *arsenic* in considerable quantity.

Plattner ('Probirkunst mit dem Löthrohre,' vierte Auflage, Leipsic, 1865) attributes to *Jeypoorite*, evidently from the description of another work, a percentage of 65.2 cobalt, with the remainder sulphur, and says of it, at p. 311, "Das Löthrohrverhalten ist nicht bekannt."

* If Middleton had found iron, copper, &c., one might have supposed that he took some of the *general* sand for his analysis, which would of course reduce the percentage of cobalt and raise that of sulphur.